NON-PUBLIC?: N
ACCESSION #: 9403110212
LICENSEE EVENT REPORT (LER)

FACILITY NAME: COMANCHE PEAK-UNIT 1 PAGE: 1 OF 7

DOCKET NUMBER: 05000445

TITLE: TURBINE TRIP/REACTOR TRIP DUE TO INDICATION OF PRIMARY FLOW LOW IN THE GENRATOR STATOR
EVENT DATE: 02/01/94 LER #: 94-001-00 REPORT DATE: 02/28/94

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: W.G. GULDEMOND, SYSTEM ENGINEERING TELEPHONE: (817) 897-8739
MANAGER

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 9:38 p.m. February 1, 1994, an indicated low flow condition on primary water to the Main Generator Stator caused a Turbine/Reactor trip. There was no actual loss of stator flow. TU Electric believes that the trip was caused by a spurious signal. Corrective actions included monitoring key points for power supply and instrument signal stability, and evaluation by the vendor.

END OF ABSTRACT

I. DESCRIPTION OF THE REPORTABLE EVENT

A. REPORTABLE EVENT CLASSIFICATION

Any event or condition that results in a manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)(EIIS:(JC))

B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

On February 1, 1994, Comanche Peak Steam Electric Station (CPSES) Unit 1 was in Mode 1, power operation with reactor power at 100 percent.

C. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO

THE EVENT

Not applicable. There were no inoperable structures, systems or components that contributed to this event.

D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE
TIMES

At 9:38 p.m. on February 1, 1994, Comanche Peak Steam Electric Station (CPSES) Unit 1 was at 100 percent reactor power when the first out annunciator panel indicated that the reactor had tripped as a result of a turbine trip. Control Room personnel (utility, licensed) responded in accordance with emergency operating procedure. All systems functioned as required; no abnormal responses were observed by station personnel.

An event or condition that results in an automatic or manual actuation of any ESF, including the RPS, is reportable within 4 hours under 10CFR50.72(b)(2)(ii). At 11:45 p.m. on February 1, 1994, the Nuclear Regulatory Commission Operations Center was notified of the event via the Emergency Notification System.

E. THE METHOD OF DISCOVERY OF EACH COMPONENT OR SYSTEM FAILURE, OR
PROCEDURAL OR PERSONNEL ERROR

The Control Room personnel (utility, licensed) were alerted by a Generator Primary Water System failure alarm which was coincident with the reactor trip first out annunciator.

II. COMPONENT OR SYSTEM FAILURES

A. FAILURE MODE, MECHANISM, AND EFFECT OF EACH FAILED COMPONENT

Not applicable. There were no component failures identified which were associated with this event.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

Not applicable. No safety trains were inoperable as a result of this event.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

Loss of stator cooling flow to the generator will result in a Turbine Generator trip. This is a secondary side transient enveloped within the Turbine Generator design and the Plant Accident Analysis outlined in the CPSES Final Safety Analysis Report (FSAR) Section 15.2.3.

TU Electric has concluded that this transient did not affect the health or safety of the public and did not adversely affect the safe operation of CPSES Unit 1.

III. CAUSE OF THE EVENT

In order to determine the cause of the low flow indication, a troubleshooting effort was undertaken based on three (3) postulated conditions: 1) An actual low flow condition occurred; 2) A low flow condition was indicated as a result of some hydraulic anomaly, but an actual low flow condition did not occur; and 3) A low flow condition was indicated/actuation occurred because of an electronic problem in the flow sensing or signal process circuitry.

While a precise cause for the indicated low stator primary water flow could not be conclusively determined, the trip is believed to have occurred due to a spurious signal in the instrument loop, leading to the generation of a trip signal.

IV. CORRECTIVE ACTION

The automatic trip which occurred on February 1, 1994, was consistent with the indicated low flow condition. In order to determine the cause of the low flow indication a troubleshooting effort was undertaken based on three postulated conditions: 1) An actual low flow condition occurred; 2) A low flow condition was indicated as a result of some hydraulic anomaly, but an actual low flow condition did not occur; and 3) A low flow condition was indicated/actuation occurred because of an electronic problem in the flow sensing or signal processing circuitry. For each of these postulated conditions a set of parameters was selected or examined to confirm or deny the condition as follows:

1) Actual Low Flow Condition

a. Isolation valve failure by stem/disk separation or stem failure
b. Primary water pump failure
c. Flow blockage of the stator cooling circuit
d. Loss of fluid inventory

2) Indicated Low Flow Condition As A Result Of Hydraulic Anomalies
a. Failed flow transmitters including bellows rupture
b. Air in transmitter sensing lines
c. Crushed sensing lines
d. Vibration-induced flow sensor anomalies

3) Electronic Problems
a. Transmitter failure
b. Cable failures/problems
c. Power supply problems
1. 480 vac input
2. 28vdc backup power
3. Power supply output
4. Power supply itself
d. Bus problems/grounds
e. Induced signals

With regard to each of these conditions the following actions were taken/observation were made:

1) Actual Low Flow Condition:

a. The isolation valve was fully stroked and corresponding system flow changes were observed in both the open and

closed directions. The

valve was radiographed and no indications of failure were observed. Based on the above and the fact that stator primary water flow existed after the trip, it is concluded that the isolation valve did not fail. Further, following the trip it was confirmed that the isolation valve was not closed.

b. Review of primary water pump operating data (pressure and vibration) before the trip did not disclose any problems. Additionally, at the time of the trip, other portions of the primary water system supplied flow by the primary water pump did not display flow losses indicative of a pump failure. Finally, examination of the pump after the trip with the turbine on the turning gear disclosed no abnormal noise or vibration one would normally associate with a significant pump failure.

Collectively, this information indicated that primary water pump failure was not the cause of the indicated low flow condition; however, pump performance was monitored during initial turbine generator startup to confirm this conclusion.

c. Flow data was taken from the stator portion of the primary water circuit with the turbine on the turning gear using temporary instrumentation independent from the normally

installed instrumentation on its sensing points/taps. The data obtained was consistent with the flow expected normally with the turbine on the turning gear. It was therefore concluded that no flow blockage exists in the affected portion of the system. Flow data was obtained during turbine-generator startup to confirm this conclusion.

d. Data was reviewed from before and after the trip on primary water head tank water level which showed that a substantial loss of fluid inventory was not the cause of the indicated low flow condition.

2) Indicated Low Flow Condition:

a. At least one output point from each flow transmitter was obtained with an imposed differential pressure which indicated the transmitters were responding acceptably and had not experienced a bellows failure. Further, simultaneous transmitter failure is not judged credible.

b. Following the trip, the transmitters were responding nominally to actual system flow, indicating that it was unlikely that air or

noncondensible gases had accumulated in significant/sufficient quantities to produce a low flow indication. Prior to startup of the turbine-generator,

the lines were filled.

c. Following the trip, a walkdown of accessible portions of the system was performed. No crushed/bent sensing lines were observed.

d. Following the trip a walkdown of the system disclosed no excessive vibration which would contribute to an indicated low flow condition. Additional walkdowns were performed during turbine-generator. Startup to confirm that excessive vibration does not exist at 1800 revolutions per minutes.

3) Electronic Problems

a. Acceptable transmitter performance was demonstrated as described in 2)a above and 2)b.

b,d. Measurements taken on system buses indicated there was a ground. Efforts were undertaken to identify and isolate the ground. The three DC power leads to the ATT cabinet were lifted which cleared the ground to the DC bus. The ground was isolated in the field prior to entering Mode 2.

c. Data acquisition equipment was installed on the power supplies for the system, this equipment was also used to monitor the power supply system at startup. The data from monitoring the power supply voltage revealed that the voltages were shifted by the presence and absence of the ground in the ATT cabinet; this is allowed by design.

e. System sensitivity to noise induced by radio signals was examined by "keying" radios commonly used in the plant at various locations adjacent to primary water system equipment. The data acquisitions equipment data did not reveal that primary water flows were affected by radio transmissions.

While a precise cause for the indicated low stator primary water flow could not be conclusively determined, the actions taken as described above demonstrated with a high degree of confidence that the cause was a spurious electronic signal. In addition system parameters were monitored during turbine generator startup to identify timely identification of residual problems.

TU Electric is monitoring key points for power supply and instrument signal stability.

V. PREVIOUS SIMILAR EVENTS

Licensee Event Report (LER) 50-445/93-005-00 for CPSES Unit 2 reported a low flow condition on primary water to the main generator stator. The event was caused due to a stem and disk separation on the generator stator flow inlet isolation valve. The details/causes of the previously reported event are sufficiently different from the event described in this LER such that the previous corrective actions could not have prevented this event.

Log # TXX-94055
File # 10200
TUELECTRIC Ref. # 10CFR50.73(a)(2)(iv)

February 28, 1994

William J. Cahill, Jr.
Group Vice President

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES) - UNIT 1
DOCKET NO. 50-445
MANUAL OR AUTOMATIC ACTUATION OF ANY
ENGINEERED SAFETY FEATURE
LICENSEE EVENT REPORT 94-001-00

Gentlemen:

Enclosed is Licensee Event Report 94-001-00 for Comanche Peak Steam Electric Station Unit 1, "Turbine Trip/Reactor Trip due to Indication of Primary Flow Low in the Generator Stator."

Sincerely,

William J. Cahill, Jr.

By:

R. D. Walker
Regulatory Affairs Manager

OB:bm
ATTACHMENT

cc: Mr. L. J. Callan, Region IV
Mr. L. A. Yandell, Region IV
Resident Inspectors, CPSES

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